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## 48-V Digital Hot-Swap Controller Supports High Power For AI Servers

Infineon Technologies' XDP711-001 is a 48-V wide-input-voltage-range digital hot-swap controller with a programmable safe operating area (SOA) control designed for high-power AI servers. The controller is said to provide superior input and output voltage monitoring and reporting with an error of ≤0.4% and system input current monitoring and reporting with an error of ≤0.75% at full ADC range, enhancing the system's fault detection and reporting accuracy.

The XDP711-001 hot-swap controller features pulsed SOA current control technology for safer turn-on in systems with non-optimal FETs for a lower system bill-of-materials (BOM) cost. This new member of the XDP product family is tailored to drive multiple MOSFETs in parallel, supporting high-power designs, which is becoming a key requirement for AI servers.

The XDP711-001 employs a three-block architecture that combines high-precision telemetry for monitoring and fault detection, digital SOA control optimized for power MOSFETs, and high-current integrated gate drivers capable of driving up to eight n-channel power MOSFETs, thus allowing designs of 4-kW, 6-kW, and 8-kW power delivery boards (PDBs). The XDP711-001 is available in a VQFN-29 6-mm x 6-mm package (see the figure).

The hot-swap controller can operate within an expansive 7-V to 80-V input voltage range and can withstand transients up to 100 V for 500 ms, delivering input power monitoring and reporting of ≤1.15% error. It features high-speed PMBus-compliant active monitoring for enhanced system reliability. A programmable gate shutdown during severe overcurrent (SOC) ensures robust shutdown operation within just 1 µs. The table below compares specifications of the XDP711-001 with other members of the XDP product family.

Additional features include IMON, PMON as well as surge immunity, which ensures higher system availability. Moreover, the fully digital operating mode minimizes the need for external components, thus offering a compact solution and making it an optimal fit for space-constrained designs in a cost-effective way.

With options for external FET selection and one-time programming (OTP), the XDP711-001 offers flexibility for programming faults and warnings detection as well as de-glitch timers for various usage models. Its analog-assisted digital mode (AADM) offers backward compatibility with legacy analog hot swap controllers.

"The Infineon XDP711-001 hot swap controller with its feature rich, high-precision analog-front-end along with comprehensive health monitoring, telemetry, programmability, and pre-set MOSFET SOA, will perfectly address the challenges associated with the current design of pluggable AI server solutions", said Magdalene Boebel, vice president ICs at Infineon. "By offering robust functionality and adaptability, the XDP711-001 exemplifies Infineon's continuous commitment to innovation, setting new standards for system reliability for AI servers and other applications such as network routers and switches."

The controller matches Infineon's OptiMOS and OptiMOS LinearFET portfolio for reliable and powerful system performance. It can be officially ordered in mid 2025. For more information, see the Protection and Monitoring ICs page.

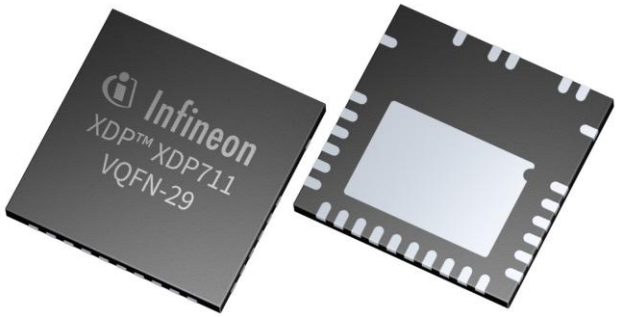


*Fig. 1. A new member of the XDP 7xx family of wide-input range digital hot-swap controllers, the XDP711-001 features fast severe overcurrent detection and shutdown as well as the company's pulsed SOA current control. It employs a three-block architecture consisting of high precision telemetry for monitoring and fault detection, digital SOA control optimized for power MOSFETs and integrated gate drivers capable of driving up to eight n-channel power MOSFETs, thus allowing designs of 4-kW, 6-kW, and 8-kW power delivery boards.*

Table. Comparing the XDP711-001 with other hot-swap controllers in this family.

| Feature | Hot swap Controller (HSC) | | |
|---|---|---|---|
| | XDP700-002 | XDP710-002 | XDP711-001 |
| Input voltage | -9.5 V to -80 V | +5.5 V to +80 V | +7 V to +80 V |
| Telemetry accuracy | V ≤ 0.5%, I ≤ 1.3%, P ≤ 1.8%, E ≤ 5.0% | V ≤ 0.4%, I ≤ 0.75%, P ≤ 1.15%, E ≤ 2.7% | V ≤ 0.4%, I ≤ 0.75%, P ≤ 1.15%, E ≤ 2.7% |
| FET driver/controller | ✓ | ✓ | ✓ |
| Modes of operation | AADM, FDM | AADM, FDM | AADM, FDM, Hybrid |
| Energy readings | 24-bit | 24-bit | 40-bit |
| Power averaging | 13 ms (128 samples) | 13 ms (128 samples) | 3 s (32,768 samples) |
| Analog reporting | - | - | Current, Power |
| Supported rails | Negative | Positive | Positive |
| High Voltage Package | ✓ | ✓ | ✓ |
| Package | VQFN-29 6x6 mm² | VQFN-29 6x6 mm² | VQFN-29 6x6 mm² |